

AD-A151 688

The Effects of Interdiction in World War II:
The European Theater of Operation

A thesis presented to the Faculty of the U.S. Army
Command and General Staff College in partial
fulfillment of the requirements for the
degree

MASTER OF MILITARY ART AND SCIENCE

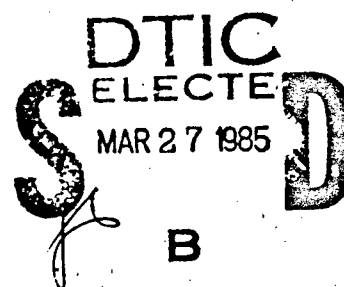
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B.S., New Mexico State University, 1971

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM	
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER	
AD-A176587		5. TYPE OF REPORT & PERIOD COVERED	Master's Thesis
4. TITLE (and Subtitle) The Effects of Interdiction in World War II: The European Theater of Operation		6. PERFORMING ORG. REPORT NUMBER	
7. AUTHOR(s) Thomas B. Poole, Maj, USAF		8. CONTRACT OR GRANT NUMBER(s)	
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT PROJECT TASK AREA & WORK UNIT NUMBERS	
11. CONTROLLING OFFICE NAME AND ADDRESS U.S. Army Command and General Staff College ATTN: ATZL-SWD-GD Ft Leavenworth, KS 66027		12. REPORT DATE 7 May 84	13. NUMBER OF PAGES 80
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15. SECURITY CLASS. (of this report) Unclassified	
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE	
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution is unlimited.			
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report) Approved for public release; distribution is unlimited.			
18. SUPPLEMENTARY NOTES			
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Strategic interdiction, tactical interdiction, battlefield isolation, effects on Army operations.			
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) See reverse			

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SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

THESIS APPROVAL PAGE

Title of thesis The Effects of Interdiction in World War II:
The European Theater of Operation

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Accepted this 16th day of May 1984 by
Director, Graduate Degree Programs.

Accession For

NTIS GRA&I

DTIC TAB

Unannounced

Justification

By Codes

and/or

Other

A-1

ABSTRACT PAGE

THE EFFECTS OF INTERDICTION IN WORLD WAR II: THE EUROPEAN THEATER OF OPERATION, by Major Thomas B. Poole, USAF, 80 pages.

This study analyzes the Allied interdiction campaign of World War II in the European Theater of Operation and identifies the target types that were most effective in supporting the land battle. The analysis is divided into strategic and tactical interdiction. The strategic interdiction campaign was aimed at German resources and lines of communication. The tactical interdiction campaign was in more direct support of the land battle; therefore, the analysis is conducted by type ground campaign supported.

Investigation reveals that the strategic interdiction campaign was most effective in supporting the land battle when striking lines of communication. The tactical interdiction campaign was most effective in a battlefield isolation role which included targets within the battlefield area. As a general rule, interdiction was more effective when employed in concert with the ground commanders scheme of maneuver. The high value targets identified were marshalling yards, rail lines, roads, defiles, supply dumps, troop concentrations, enemy columns, bridges, communication centers, signal communications, and anti-aircraft artillery.

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CHAPTER I

INTRODUCTION

INTRODUCTION

The efficient use of air power in modern warfare is paramount to winning. Air power is an important commodity which always seems in short supply; therefore, the United States must employ its air assets in a way that brings the biggest return for the effort. To do this, it is necessary to know which targets result in the greatest loss to the enemy if destroyed. This must be weighed against the level of effort or cost required to destroy the target. Finally, these considerations need to be compared against our strategic and tactical objectives.

The effects of strategic interdiction campaigns on land battles of previous wars vary from one campaign to the next. It may take months for the results of a strategic bombing campaign to be felt at the tactical level. The length of time is dependent upon the targets chosen, their proximity to the Forward Line of Own Troops (FLOT), and their importance to the enemy.

Interdiction is broken down by AFM 1-1 into two

categories: Air Interdiction (AI) and Battlefield Air Interdiction (BAI). The difference between the two is where the target is located and who nominates it. In the case of BAI, the target is nominated by the Army and may lie anywhere beyond the FLOT, but generally ends at the boundary of the Corps area of interest. AI targets are nominated by the Air Force or the Army, and lie beyond the Fire Support Coordination Line (FSCL). To relate these modern day definitions to World War II experiences, AI can be thought of as strategic (or deep) interdiction, and BAI as tactical interdiction. During World War II, a specific area ahead of Allied ground forces was identified as the tactical area, and interdiction targets within that area were considered tactical interdiction targets. Targets beyond that area were classified as strategic interdiction targets. In this thesis, the World War II terms of tactical interdiction and strategic interdiction will be used to separate the battlefield targeting areas.

BACKGROUND

Men have contemplated the idea of dropping bombs from aircraft ever since the first aircraft was built. During World War I, some initial experimentation occurred with dropping bombs from aircraft. Bombs were dropped on the battlefield in close support of ground forces, as well

as in an interdiction and counter air role. The German interdiction effort of World War I included 36 tons of bombs on London, and 241 tons on the rest of the United Kingdom.¹ This was an insignificant number of bombs by modern standards, but even this small effort caused people to think about the role of bombing. Considerable effort was spent developing this capability between the wars.

The first concentrated effort at modern aerial interdiction occurred in the spring of 1944.² Gen. Eisenhower proposed using air power against logistics and lines of communication (LOC) during the Italian campaign. The effort was called Operation Strangle and attempted to cut all rail lines leading south from the Po Valley. Prior to this, United States air assets, located in the Army Air Force, were parcelled out to the various ground commanders to be used as they saw fit. Thus, the air forces were employed in a decentralized mode, committed to the specific ground commander supported. The result was an inefficient use of air power. The United States was not able to use the great mobility inherent in air power to mass forces where they were most needed. As the war progressed, this lesson was learned and all air assets were placed under a single commander. This concept of centralized control continued to the present with the air forces eventually becoming a separate service in 1947.

Placing air assets under one commander resulted in

air power being used more in interdiction and less in direct troop support than before. The interdiction campaign that finally developed in World War II was centrally controlled and extensive in scope. It frequently included raids of over 1000 planes. The strategic targets consisted primarily of lines of communication, industrial centers, petroleum storage and refineries, and population centers. The war lasted long enough for the results of the strategic interdiction campaign to have an effect on the tactical battle. The tactical targets of the BAI campaign included troops, motor transport, supply areas, LOCs, and gun emplacements. The tactical interdiction targets had a more immediate effect on the tactical battle.

The interdiction planners of World War II received their guidance from the Combined Chiefs of Staff. The mission statement given them stated:

...to conduct a joint US-British air offensive to accomplish the progressive destruction and dislocation of the German military, economic and industrial system and the undermining of the morale of the German people to a point where their capacity for armed resistance is fatally weakened. This is construed as meaning so weakened as to permit the initiation of final combined operations on the continent.³

From this guidance, planners developed target lists and assigned priorities. The target list developed for the strategic interdiction plan consisted of six target systems comprising 76 precise targets.⁴ The Combined Strategic Targets Committee was formed to conduct weekly reviews of

the interdiction campaign effects, and to reassess the importance of targets to the enemy. The committee then issued new priorities as appropriate. Although priorities were given to weigh the main interdiction effort, all target types were attacked. These targets were attacked primarily by the heavy bombers of the 8th Air Force, the United States command responsible for prosecution of the strategic interdiction campaign.

The tactical interdiction campaign, however, had a more immediate effect on the ground battle. The US 9th Air Force had primary responsibility for tactical air power in support of the ground forces in Western Europe. The tactical interdiction campaign was conducted primarily by fighter bombers, but medium bombers were also used. The mission of these tactical air forces was outlined in a 1943 Army field manual (FM 100-20) titled Command and Employment of Air Power. The manual stated:

The mission of the tactical air force consists of three phases of operations in the following order of priority: (a) First priority - To gain the necessary degree of air superiority. This will be accomplished by attacks against aircraft in the air and on the ground, and against those enemy installations which he requires for the application of air power, (b) Second priority - To prevent the movement of hostile troops and supplies into the battle area or within it, (c) Third priority - To participate in a combined effort of the air and ground forces, in the battle, to gain objectives on the immediate front of the ground forces.⁵

Large scale employment of tactical air power in Europe did not start until shortly before the Normandy landings in June

of 1944.⁶ Therefore, the emphasis of this study is on tactical interdiction conducted after June 1944.

Interdiction campaigns of the future are likely to receive different emphasis than those of the past. Modern weapons are highly mobile; thus strategies are beginning to be based on short decisive wars. A long range deep interdiction campaign may not have time to reach fruition before the war ends or before strategic targets are beyond the range of friendly aircraft. Additionally, the presence of tactical nuclear weapons on the battlefield will change target priorities as well as battlefield tactics.

One of the key aspects of an interdiction campaign is target selection. Targets must be chosen with several considerations in mind. First, the target must be vulnerable to the effects of one's weapons. Secondly, it must be a target that pilots can find by whatever means available. Finally, the target when destroyed must have the desired effect on the enemy. Thus, target selection is a detailed process. The aspects of target vulnerability and pilot ability to locate a target are fixed, based on equipment available; therefore, consideration of these factors is a straight forward process that varies only as new equipment becomes available. However, target selection, based on the importance of the target to the enemy, is a difficult process that is constantly changing as situations and enemies change.

For example, during World War II a concerted effort was made to destroy the enemies fuel supplies. In an attempt to protect their supplies, the Germans hid their fuel in underground storage tanks. This made the destruction of the fuel tanks difficult. A prisoner of war gave the Allies information about a pump house at the Straassfurt storage area that was the means by which all of the fuel in the storage tanks was pumped out. This gave the Allies a critical aimpoint to shut down their operation.⁷ This identification of key targets and critical aim points on the target complexes was crucial to the success of the interdiction campaign.

PROBLEM STATEMENT

The target types that will bring the highest payoff in the next war are not fully known. In a short decisive campaign, those interdiction targets that have the most immediate effect on the land battle are high value targets. A thorough analysis of World War II, to identify the high value targets, would provide insight into the possible high value targets of future wars.

THESIS PURPOSE

To determine what interdiction targets constituted high value targets in the short decisive campaigns of World War II in the European theater of operations.

ORGANIZATION OF THE STUDY

Chapter II provides a review of literature on historical interdiction campaigns and target value analysis.

Chapter III analyzes strategic interdiction efforts employed and their effect on major decisive ground campaigns of World War II.

Chapter IV analyzes tactical interdiction efforts employed and their effect on major decisive ground campaigns of World War II.

Chapter V analyzes the effects of interdiction and identifies the high value targets in World War II. Conclusions are drawn on the factors effecting determination of high value targets. The chapter concludes with recommendations for future study.

LIMITATIONS OF THE INVESTIGATION

This thesis is limited by the following:

1. Only the effects of strategic and tactical

interdiction on the land battle will be looked at. It assumes that the ground forces are receiving some close air support (CAS).

2. Only interdiction in support of major decisive ground campaigns in Europe during World War II will be examined.

3. The effect of air interdiction against German submarine construction yards and bases will not be examined because this effort was not in support of the land battle.

4. The thesis will remain unclassified so as to receive the widest possible dissemination.

FOOTNOTES

¹Encyclopedia International (Lexicon, 1980), p. 119.

²Major Frank J. Merrill, A Study of the Aerial Interdiction of Railways During the Korean War (Ft Leavenworth, 1965), p. 4.

³Committee No. 20, 2d Command Class, Analytical Studies: Strategic Air Operations (Ft Leavenworth, 1946), Appendix B.

⁴Combined Chiefs of Staff, Plan for the Combined Bomber Offensive from the United Kingdom (London, 1943), pp. 5-6.

⁵Air Effects Committee 12th Army Group, Effect of Air Power on Military Operations Western Europe (Wiesbaden, 1945), p. 24.

⁶Army Air Forces Evaluation Board, Tactics and Techniques Developed by the US Tactical Air Commands in the European Theater of Operations (Hq AAF, 1945), preface.

⁷SHAEF Combined Strategic Targets Committee, Working Committee (Oil Production and POL Depots), Weekly Bulletin No. 1945-7 (London, 1945), para V.

CHAPTER 2

REVIEW OF LITERATURE

INTRODUCTION

The review of literature reflects the focus on major decisive ground campaigns with emphasis on the experience of US Forces in Europe during World War II. The literature is divided into two parts: information on strategic and tactical interdiction. Each of these areas is separated into contributory and noncontributory material. An additional subdivision is made under strategic interdiction, literature that contributed. In this instance, information is further categorized into World War II in Europe, World War II in the Pacific, and the Korean War.

STRATEGIC INTERDICTION

LITERATURE THAT CONTRIBUTED, WORLD WAR II IN EUROPE:

A study of strategic interdiction in Europe during World War II, necessitated a further study of the plans made for the conduct of the interdiction campaign, as well as studies made on the effect of the campaign to date. The Combined Chiefs of Staff wrote a "Plan for Combined Bomber

Offensive from the United Kingdom." This plan organized interdiction targets into six target systems which would receive different priorities as needed during the course of the war. It laid out the goals of the Combined Bomber offensive and stated their assumptions. This document provided valuable information on the system used in planning the strategic interdiction effort and in subsequent choosing of targets in World War II.

The Combined Chiefs of Staff also wrote a "Plan to Assure the Most Effective Exploitation of the Combined Bomber Offensive." This document discussed the need to move bombers from the United Kingdom to Italy once the Italian bases were secured. This would open up targets that previously were out of range to United Kingdom based bombers. The document was somewhat useful as it gave insight into the thought process of the people charged to choose strategic interdiction targets.

At Supreme Headquarters Allied Expeditionary Forces (SHAEF), a Combined Strategic Targets Committee was established to periodically review the results of the interdiction campaign and make recommendations on future priorities. The minutes from their 21st meeting contained a report from the working committee on communication targets. Data in this report demonstrated the effect interdiction of LOCs had on how long it took German troops to reach the battle. Only a few specific examples were included and

cover a limited period of time; therefore, the document was of limited value.

The Combined Strategic Targets Committee had working committees for each of the major target groups. Weekly Bulletin No. 18 from the Communications committee contained data on the effect of interdiction on LOCs and gave specifics on rail and road activity. Additionally, it updated the target list and established new target priorities. This same type of information was contained in the Oil Production and POL Depots Committee Weekly Bulletin No. 1945-7, and the Armored Fighting Vehicles Committee Weekly Bulletin No. 5. While this information was useful, it covered only a limited cross section of the overall effort.

Most of the updated information used by the Combined Strategic Targets Committee came from the United States Joint Intelligence Committee. Their Weekly Summary No. 98, dated 23 Nov 1944, contained information on the Rumanian Oil Field attacks. Details were given on oil production rates before and after the raids, as well as oil stockpiles still available after the raid. These details were useful, but the raid represented only a small part of the strategic interdiction campaign.

Reviewing the information written during World War II was important to understanding the logic of the planners; however, the studies written after the war offered the best

information from which to base future decisions. The United States convened a Theater General Board to study US actions during World War II. Their study No. 36, entitled "Air Power in the European Theater of Operations," examined the impact of the Allied strategic interdiction campaign on the German economy. The report contained useful information on the level of destruction achieved and the subsequent effect on the German war effort.

Other agencies were tasked to write studies after World War II. The Assistant Chief of Staff for Intelligence conducted a study of "Strategic Bombing of Axis Europe Jan 43 - Sep 44: Bomb Damage to Axis Target Systems." This contains a detailed report of results achieved by the interdiction campaign during the times indicated. The intelligence community also released information obtained from prisoner of war interrogations. The interrogation of Reich Marshal Hermann Goering contained interesting information on the positive and negative accomplishments of the Allied interdiction campaign. This report was very useful because it revealed high value targets from a senior German officers point of view.

The Army Air Forces published a confidential magazine called Impact. The July 1945 issue had an excellent article that summarized the effects of the strategic interdiction campaign and reviewed the changes in target prioritization that occurred during the war. It also

had an article on tactical interdiction that was helpful.

There were several other studies done by individuals and groups after the war. The 2nd Command Class, Committee #20, at Ft. Leavenworth, conducted a study dated July 24, 1946, entitled "Analytical Studies Strategic Air Operations." This study evaluated the Allied interdiction campaign and put forth a plan on how to evaluate an interdiction campaign. Written just shortly after World War II and in an academic environment, it contained a thorough review of the interdiction effort and evaluated the effects of the interdiction campaign. The study was a major contribution to this thesis.

WORLD WAR II IN THE PACIFIC:

The interdiction effort in the Pacific during World War II was considerably different than that conducted in Europe. Dr. Joe G. Taylor, an Air Force historian, wrote a book for the Air Force on "Air Interdiction in China, World War II." This report, published in 1956, examined the strategic interdiction conducted against the Japanese in China. Although he reached some interesting conclusions on weaponeering and targeting, his book was only a minor contribution to the study.

The intelligence section of 14th Air Force Headquarters wrote a report immediately following the war with Japan titled "14th AF Operations against Railroads: The Japanese View." This was a particularly interesting report because

it contained several pictures of the Japanese railroads taken from the ground by survey parties. This allowed for a detailed report on interdiction bombing effectiveness. Since this thesis is focused on Europe, the report made little contribution to the study.

KOREAN WAR:

Major Frank J. Merrill did a thesis titled "A Study of the Aerial Interdiction of Railways During the Korean War." In it he demonstrated the effects that an interdiction campaign against LOCs had in a mountainous country heavily dependent on railroads. He also drew interesting conclusions concerning the relationship between target importance and the level of battlefield activity. Although this information did not cover Europe in World War II, his conclusions supported lessons learned in World War II and thus were useful to this study.

LITERATURE THAT DID NOT CONTRIBUTE:

Reports made by Army Groups that covered interdiction results. However, many were of such a limited scope that they were not useful. An example was a 6th Army Group report titled "Bombardment of Royan, France." Although the town was completely destroyed, little effect on military operations resulted.

The interdiction effort of World War II was put into perspective by Alexander P. DeSeversky in his book titled "Air Power: Key to Survival." He evaluated Allied target

priorities and made recommendations on how we could have performed better. His book is on the bibliography list of AFM 1-1, the Air Forces basic doctrine manual. It was not a contributor to the study because of its broad scope and lack of detail.

TACTICAL INTERDICTION

LITERATURE THAT CONTRIBUTED:

F/LT H. P. Clough, a British intelligence officer assigned to the Mediterranean Allied Air Force headquarters, wrote a report titled "Interdiction of Railways in Southern France and Northern Italy (Weekly Status Report) 11-17 Aug 1944." The report commented on the effects of the effort to isolate the battlefield. Details were given on bridge destruction and traffic levels. This report made only a minor contribution because it covered just one week.

Another report from the same headquarters titled "Report on Operation Dragoon," discussed the effect of fighter bomber attacks on retreating Germans. Information was given on munition effectiveness. The report gave numbers of aircraft lost and enemy equipment destroyed. This report was partially useful.

Sgt Timothy W. Pasma, a writer in the 6th Army Group Press Department, wrote a report called "Reduction of the Colmar Pocket." This report listed fighter bomber results

and included prisoner of war testimony to the effects of the tactical interdiction campaign. The prisoner of war testimony was useful to verify tactical interdiction effects.

Two reports were written by the Army Air Forces Evaluation Board during World War II. They were titled: "Study of Doctrine, Organization, Tactics and Techniques of the Army Air Forces" and "Tactics and Techniques Developed by the US Tactical Air Commands in the European Theater of Operations." The first report covered the Normandy invasion and the second covered operations up to the end of the war in Europe. Both have excellent examples of the effects of tactical interdiction and were quite useful.

After the war several studies were made that were valuable for extracting lessons learned. The War Department had a report titled "The effects of Strategic and Tactical Air Power on Military Operations ETO" [sic: ETO - European Theater of Operations]. The report contained raw data on the effects of the tactical interdiction campaign and identified air support for each type of ground mission. The data was useful in assessing the effects of interdiction on the land battle.

The Intelligence section of Headquarters Army Air Forces wrote a pamphlet on "Air-Ground Teamwork on the Western Front." The report covered Gen. Patton's 3rd Army's push across France and the support provided him by the XIX

Tactical Air Command. This was a very valuable source of tactical interdiction tactics and effects.

Study number 54, written by the Theater General Board, was written in 1947 and attempted to evaluate tactical interdiction results in light of enemy information received after the war. Some of this information came from prisoner of war interrogations such as Reich Marshal Hermann Goering's. He answered questions on the effects of tactical interdiction on German operations. Other sources were, "Allied Surrender Documents, Mediterranean," a report from the intelligence section of Mediterranean Allied Air Forces Headquarters. This report covered tactical interdiction results, from the enemy perspective, of the Italian Campaign. These reports were very useful in this study.

The Air Effects Committee, 12th Army Group, produced an excellent report on "The Effects of Air Power on Military Operations Western Europe." This report was directed by General Eisenhower and the research committee was headed by General Bradley, Commander of the 12th Army Group. The report was a formal, hard-bound book that covered all aspects of air power and lessons learned. The information was so thorough and the report so well written that it was the primary source used in this thesis.

LITERATURE THAT DID NOT CONTRIBUTE:

Several masters theses have been written about tactical interdiction on the modern battlefield. Major

Henderson's thesis, "The 'Air' in the AirLand Battle," supported the use of battlefield air interdiction (BAI) missions against the second echelon of Soviet forces. He covered present day capabilities to destroy tactical interdiction (i.e. BAI) targets. His coverage of BAI did not contain very much data on targets and so was not useful to the study.

Major Millers' thesis, "The F-16 in Offensive Air Support," discussed BAI mission control, the ability of the F-16 to perform the BAI mission, and the targets most vulnerable to the F-16. The thesis was aircraft specific and thus of limited value to this study.

Major Busico's thesis, "Battlefield Air Interdiction: Airpower for the Future," recommended BAI as a separate mission, apart from air interdiction (AI). His thesis focused on the organization of BAI and contained nothing useful to this study on tactical interdiction targets and effects on the battle.

SUMMARY

The most important source in this study was "The effects of Air Power on Military Operations Western Europe." This was a formal report written immediately after World War II under the direction of General Bradley. As such it represented the best effort of the commanders who fought the

war to evaluate the positive and negative attributes of the
World War II experience in managing air power.

CHAPTER 3

STRATEGIC INTERDICTION

INTRODUCTION

This chapter analyzes strategic interdiction efforts employed during World War II. It begins with a look at the purpose of interdiction and discusses interdiction targets. It then examines the organization of the forces available to accomplish the strategic interdiction campaign. A thorough analysis of the strategic interdiction campaign is conducted next and the results are evaluated.

PURPOSE OF INTERDICTION

Air interdiction is defined in Air Force Manual 1-1 this way:

Air interdiction operations are conducted against the enemy's military potential before it can be effectively used against friendly surface forces. These operations restrict the combat capability of the enemy by delaying, disrupting, or destroying their lines of communications, their forces, and their resources. It is used to disrupt enemy plans and time schedules.¹

The effect of operations against the enemy's

military potential varies based on the rate at which the enemy is forced to commit his military potential. That is to say, the pace of the ground and sea battles influence the rate at which the enemy consumes supplies. The faster he consumes supplies, the more dependent he is on resupply and the methods of resupply, i.e. lines of communication. In a static battle, a force may exist longer on a given input of supplies than in a dynamic battle. For an interdiction campaign to have a more immediate effect, the ground forces need to put constant pressure on the enemy to force him to consume his supplies at a high rate. Put another way, the interdiction campaign must be planned to support the ground commanders scheme of maneuver. The combined effect of raising the consumption and lowering the supply rate will reduce the enemies war fighting capability.²

There is an example from World War II of how tactical interdiction can have a tremendous effect on the battle when planned in a way that compliments the ground commanders scheme of maneuver. In China during World War II, the US Army Air Force spent a great deal of time on tactical interdiction against the Japanese with little result on the ground battle until the siege of Hengyang and the offensive against Chihkiang. In these two cases the effect of tactical interdiction was great because the Japanese faced stiff resistance causing them to expend supplies at a high rate. This meant that the lines of

communication and flow of supplies to their forces had become critical; therefore, US bombing had a magnified effect. Also, the enemy was forced to concentrate his forces, thus producing a more lucrative air target.³

The focus of this thesis is on short decisive campaigns where there is stiff resistance and thus high supply consumption rates. This focus provides the opportunity to look at interdiction and its effects in a setting resembling possible future wars. A study of the period from the Normandy landings to the Rhine River crossings, when resistance on a large scale virtually ended, allows the evaluation of the effects of both strategic and tactical interdiction.

STRATEGIC INTERDICTION TARGETS

The United States no longer has the assets to send 1000 plane raids against strategic interdiction targets as it did in World War II. Since the battles of the future are likely to move at a much faster pace, it is imperative that we allocate our limited air assets against targets with a shorter payoff time. These targets will be referred to as high value targets. To help identify these high value targets of the future, this chapter examines the strategic interdiction efforts of World War II and evaluates the results.

In order to have this analysis be useful in predicting future high value targets, it is necessary to evaluate several historical examples that approximate conditions likely to be prevalent in a future war. The military operations, beginning with the Normandy invasion and continuing to the crossing of the Rhine River, offer good examples and will be the primary vehicle used to analyze the interdiction effort. This time period covers the decisive campaigns of St. Lo, Eschweiler, Ardennes counter-offensive, Brest and Seine-Loire. These were important campaigns in which air power, specifically air interdiction, played an important role.⁴

To choose high value targets it is important to consider the overall military strategy. As an example, if the pace of battle is anticipated to be fairly low, it is better to target major weapons systems at the producing factories and on the battlefield vice petroleum refineries and storage facilities. An example from World War II shows how strategic interdiction often accomplishes its bombing mission, while having little effect on the ground battle. The example is the massive and costly interdiction campaign against the Rumanian Oil Fields. After Rumania fell, the Allies captured documents showing that they had seriously damaged the refineries capability to produce oil products. However, the documents also showed that the enemy had so much oil stockpiled that the Allied bombing of the oil

fields had little effect on the battlefield before the end of the war.⁵ In this instance, the overall military strategy was not aided by the interdiction of the oil fields. While it was true that at this point of the war Germany was short of oil, the shortage of oil was most felt on the battlefield and was due in a large measure to Allied bombing of the transportation systems needed to bring whatever oil was available up to the front lines. It is important to keep the interdiction effort in line with the overall strategy. In many cases this means attacking targets that are closer to the front lines.

In a modern industrialized country it is difficult for strategic interdiction to have an effect on the battlefield unless a massive campaign was carried out. One of the principles of war is economy of force. An obvious advantage exists in applying the preponderance of interdiction resources close to the battlefield. In this way, it is not necessary to take on the entire economic capability of a nation. It only becomes necessary to concentrate on the portion that the enemy has managed to place in the way of the ground forces.

ORGANIZATION OF THE STRATEGIC INTERDICTION EFFORT

To better appreciate the effects of strategic interdiction in World War II, it is necessary to look at the

organization of the Army Air Forces that supported the ground campaign. The Army Air Force was subdivided into numbered air forces. The 8th Air Force (8th AF), with headquarters in England, was composed of heavy and medium bombers and responsible for the strategic interdiction campaign. The 9th AF also had its headquarters in England but conducted operations from both England and North Africa. The 9th AF was composed primarily of fighters and fighter bombers but also had some medium bombers. In addition, two other air forces, the 12th AF and 15th AF, were in Europe. These forces fought primarily in North Africa and Italy.

The ground force supported during the Normandy campaign to the Rhine River was the 12th Army Group. It consisted of three armies; the 1st Army, 3rd Army, and 4th Army. The 9th AF was divided into three tactical air commands (TACs), the IX TAC, XIX TAC, and the XXIX TAC. For purposes of support, the following arrangement was established:

<u>12th Army Group</u>	<u>9th Air Force</u>
1st Army -----	IX TAC
3rd Army -----	XIX TAC
9th Army -----	XXIX TACs

The support given by the 9th AF included tactical interdiction and close air support. The 12th Army Group received indirect support from the 8th AF in the form of strategic interdiction. Additionally, it was possible for any of the army groups to receive direct support for their ground operations from the 8th AF. This required

coordination well in advance and received second priority to strategic interdiction.

STRATEGIC INTERDICTION

MISSION

The mission statement for strategic interdiction, as given in chapter 1, included the goal of destroying and dislocating the German military, economic and industrial capacity. The problem came in determining the best way to achieve this goal. Therefore, it was necessary for the Allies to establish a plan of attack that adhered to and complimented the strategic objectives.

The Allies had a relatively secure base of operations in England from which to launch their campaign. There have been those who were proponents of the idea that a nation could be forced to surrender by strategic bombing alone. The Italian Douhet, for example, believed that bombing the populace would destroy morale and the people would force their leaders to surrender. The bombing of London and Berlin in World War II, however, produced quite the opposite, making the people even more determined to win rather than surrender.⁷

TARGETING PLAN

Immediately following the war, Reich Marshal Hermann Goering was asked during interrogation, "Could Germany have

been defeated by air power alone, using England as a base, without invasion?" His response was, "No, because German industry was going underground,..."⁸ He also indicated that the land battle was taking manpower away from the factories. This loss of manpower would not have been a problem if the invasion had not been attempted.

On the other hand, an invasion is not possible without first softening up the defenses through strategic interdiction. Documents obtained in Italy after the Italian government surrendered showed that invasion of their country would not have been possible without the bombing that was conducted on their transportation and communications assets. Due to the allied air effort during the invasion of Italy, it was extremely difficult for the enemy to transport reserves to the front where they could be used.⁹

In establishing a plan to support the invasion of Normandy and the subsequent push through France into Germany, the strategic interdiction planners had to consider the short and long term needs. The short term need of establishing a beachhead called for a softening of defenses without revealing the location of the invasion. The long range needs of the push to the Rhine involved bombing targets that would prevent the enemy from bringing up reinforcements and supplies, and destroy or dislocate supporting industries and economy.

To accomplish this, the Army Air Force utilized the

Combined Strategic Targets Committee. It was "combined" because it involved the British, as well as, the United States. This committee established the direction of the strategic bombing campaign for the Allies. The committee established working subcommittees, each responsible for analyzing a target type, recommending specific targets, and analyzing the results of the Allied bombing effort against their recommended targets. The six major target systems analyzed were:

1. Submarine construction yards and bases
2. German aircraft industry
3. Ball bearings
4. Oil
5. Synthetic rubber and tires
6. Military transport vehicles¹⁰

This list of target systems was arranged in order of priority according to the needs of the time. The strategy began with the German aircraft industry having first priority. This continued until March 1944, at which time transportation became number one. In May 1944, the priority switched to oil. This changing of priorities reflected the analysis undertaken to determine the high value targets based on the needs most critical to the enemy. For example, in May 1944, when the Allies switched to bombing oil, the Luftwaffe was so weakened that it rarely opposed Allied formations unless it was to protect German oil.¹¹

The task of supporting the Normandy invasion was a difficult one. The need to keep the invasion location secret hampered their efforts. One of the most important

factors facing the invading force was the number of divisions that could be placed on the beach-head in a given amount of time. This had to be balanced against the number of divisions the enemy could add to the battle in a given amount of time.

At Normandy, the defender clearly had the advantage. The defense consisted of a long line of fortifications that stretched all along the French coast. Additionally, access to good transportation systems was available to move troops laterally, once the invasion site was identified. To prevent Allied forces from facing overwhelming odds, Allied strategic bombers concentrated on the transportation network the enemy would use to move troops to Normandy. This would isolate the battlefield and insure the Allies a more favorable force ratio. The plan covered a wide area so that this goal could be accomplished without compromising the invasion location.

The invasion was code named OVERLORD. As the time grew near for the invasion, the Combined Chiefs of Staff gave the following guidance:

The progressive destruction and dislocation of the German military, industrial and economic system, the disruption of vital elements of lines of communication, and the material reduction of German air combat strength by the successful prosecution of the Combined Bomber Offensive from all convenient bases is a prerequisite to OVERLORD. This operation must therefore continue to have highest strategic priority.¹²

The preparation for OVERLORD began with deep strategic

interdiction and moved closer to Normandy as invasion day approached. This battlefield isolation program was only part of the strategic effort. The Combined Chiefs of Staff were anxious to secure bases in Italy from which to conduct strikes into the heart of Germany and force the Germans to split their defenses. Targets had to be chosen that would contribute to the invasion effort.

In choosing interdiction targets, the Allies had to locate the targets and prioritize them. In locating the targets, the target committee relied heavily on intelligence. They appeared to have had access to extensive and detailed information. It is quite possible that they were benefitting from ULTRA, the code word for intercepts of German messages. The Allies had broken the German code and were intercepting German high level radio transmissions. (Note: the fact that the Allies had broken the code was not revealed until 1972, well after World War II.) From this intelligence, the Allies put together lengthy target lists.

The next step was to assign target priorities. This was done by: deciding the importance of the target to the enemy; checking to see if the capability to destroy it existed; and assessing the effect target destruction would have on the land battle. An example of this process was the choosing of ball bearing factories as a priority target at one phase of the bombing.

Ball bearings are important, even though they are only

a small part of a weapon system or a motor. It seems reasonable to assume that a ball bearing factory could easily be destroyed. However, the problem existed in determining the location and number to be destroyed. Ball bearing factories were chosen because all the factories were located in the same general area.¹³ If these factories were destroyed, it could have a large impact on the battle. However, putting this into perspective, the effect on the battle would probably not be felt for weeks or even months.

RESULTS ACHIEVED

Next, the results achieved by the strategic interdiction campaign are examined. From the overall perspective, the planners estimated that the success rate of 100 bombers would be the achievement of successful destruction within 1000' of the aimpoint. Additionally, two thirds of the dispatched missions would be effective.¹⁴

Attacks against oil production in late 1944 through early 1945 resulted in a reduction of approximately 30% below pre-raid output. During this period, operations had to be conducted against approximately twenty oil targets to keep the pressure on the enemy. Many attacks were conducted with little or no damage to the target. Priority was placed on refineries with depots receiving only minor importance.¹⁵

When the Normandy invasion took place, the Allies had only succeeded in reducing the oil supply rate by 20%,

which probably had little effect on the battle. By August 1944, Allied air attacks and the Russian capture of the Rumanian refineries had succeeded in reducing the flow of oil by 50%. This effort, when combined with the battlefield isolation campaign conducted by both strategic and tactical air forces, caused the shortage of gasoline to have an effect on the ground battle. This effect began to be felt after the break-out from the ST LO-PERIERS road, 23-27 July 1944.¹⁶

In the area of tank production, the Combined Targets Committee had a long list of targets which included plants involved in assembly, engine production, tracks, spare parts, etc. They also had good reconnaissance pictures of tank production such as new tank hulls at assembly plants. In March 1945, the Combined Targets Committee received the following opinion from the War Office:

...the major tank spare parts, and repair depots at Magdeburg/Altengraben and Grafenwoehr are strategically and tactically very important to the land battles now raging.¹⁷

From this the Combined Targets Committee could rearrange the priorities of targets to have a more immediate effect on the ground campaign. While it was certain that these bombing efforts produced set-backs in production schedules, their effect on the ground battle was not measurable. A report after the war offered this bit of information on Allied efforts to halt German tank production:

But the heavy losses of tanks in battle suffered

at CAEN, ST LO, MORTAIN, in retreats across the SEINE, at MONS, and LUNEVILLE were practically made up by the time of the ARDENNES offensive on 16 December, 1944.¹⁸

Of all the possible strategic interdiction targets, strikes against transportation (in an effort to isolate the battlefield), produced the most immediate effect on the ground battle. Prior to the Normandy invasion, the Allies conducted an interdiction campaign titled "Transportation Plan". As mentioned earlier, it was watered down by the necessity to hide the planned location of the invasion. Even so, it did much to hurt the German effort. In one area, intelligence reported 400 trains per week crossing a stretch of track in the first week of April 1944. By the week ending 16 June 1944, the traffic on that line had been reduced to only 14 trains.¹⁹ During this campaign the Allies hit marshalling yards, made rail cuts, and dropped bridges. An evaluation conducted after the war concludes that strikes on marshalling yards and railcuts only hindered the Germans; hitting bridges, however, had a more lasting impact.²⁰

A large interdiction campaign was conducted behind the West Wall. This campaign had little immediate or discernible effect on the battlefield. This was partially due to insufficient forces being available to adequately isolate the battlefield; thus, the overall effects were of questionable value.²¹

Better results were achieved during operation ANVIL, the invasion of France from the south. Air operations began ten days prior to the invasion with the intent of isolating the battlefield. This was accomplished by hitting railroad bridges and cutting rail lines. Of the six bridges between Lyons and the sea, only one of them was in operation when the invasion began, and it was limited to single lane traffic. After two days of fighting, no new units had made it through to reinforce the enemy.²²

The Allies achieved good battlefield isolation in Ardennes-Eifel and excellent in the Remagen Bridgehead despite bad weather. However, quite different results were achieved in operation CLARION. This was a massive bombing campaign of the German rail system that began on 22 February 1944. For this campaign, Germany was divided into sectors with an air force responsible for each sector. It was a very heavy effort involving 2192 heavy bombers, 860 medium bombers, and 3388 fighter sorties against 209 targets with 8371 tons of bombs. The results achieved were disappointing. The Allies lost over 75 aircraft with little effect on the enemy. The reason was lack of coordination with any army offensive. The bombing could still have had an effect if it had been limited to the tactical area, but it wasn't. The following lesson was learned from this operation:

Experience has shown throughout that attacks on transportation must give priority in

time and space to those transportation facilities immediately available to the opposing forces or their reserves.²³

Although the results were minimal in the example above, when the interdiction campaign supported the ground maneuver plan, the Allies achieved good results. In March 1945, the Communication Targets Committee offered the following example to show the effects strategic bombing of transportation systems was having on the enemy:

...it was known that the 11th Panzer Division had started to move on 13.2.45 from TRIER to the COLOGNE area, a rail journey of not more than 100 miles. This division did not begin to arrive on the COLOGNE front until 27.2.45 and then could be committed only piecemeal. There was also much evidence of the enemy's shortage of ammunition, which could no doubt be accounted for partly by communications difficulties, partly by production difficulties.²⁴

This is a good example of how a battlefield isolation campaign can affect the battlefield. The mission of battlefield isolation falls in today's BAI category and is thought of more as tactical interdiction.

INTERDICTION LESSONS LEARNED

Several lessons of a general nature were learned from World War II that could apply today to the conduct of strategic interdiction:

1. The economy of a nation is more sensitive to the basic industries and services than factories turning out finished products.
2. A low threat environment is necessary in order to have a continuous flow of attacks on the targets.

3. Attack the enemies mobility.

4. Destroy the enemies reserves (the ones critical to him).

5. Divert strategic interdiction sorties to tactical interdiction when it becomes apparent that continued attack of strategic interdiction targets will not influence planned surface operation.²⁵

Other lessons were learned that applied specifically to World War II. For example, analysis after the war suggests that it would have been better for the Allies to have concentrated on one aspect of the strategic interdiction campaign and destroyed it completely than to have gone for the shotgun effect.²⁶ Another lesson learned was to make attacks against airframes as opposed to engines or other component parts because they represented an almost finished product, and thus, would have a more immediate effect on the battle. This turned out to be a good idea because later analysis concluded that the attacks of ball bearing plants had no measurable effect on the war.²⁷

Bombing of the German transportation system proved a good choice in World War II. It was felt after the war that bombing of the transportation system was the most significant contributor to Germany's collapse. This is even more significant when one considers that this campaign did not start until late in the war.²⁸

SUMMARY

This chapter looked at the purpose, targets, and organization of the strategic interdiction campaign. It identified the effort necessary to pick high value targets, analyzed the results achieved by the strategic interdiction campaign, and looked at interdiction lessons learned. The next chapter will look at tactical interdiction which had a more immediate effect on the battle.

FOOTNOTES

¹Department of the Air Force, Functions and Basic Doctrine of the United States Air Force (Washington, 1979), p. 2-13.

²Merrill, Interdiction Korean War, p. 6.

³Dr. Joe G. Taylor, Air Interdiction in China, World War II (Washington, 1956), p. 84.

⁴Air Effects Committee 12th Army Group, Effect Western Europe, p. 25

⁵US Joint Intelligence Committee, Weekly Summary, Number 98 (Washington, 1944), pp. 31-32.

⁶Air Effects Committee 12th Army Group, Effect Western Europe, p. 25.

⁷Edward Mead Earl, Makers of Modern Strategy (Princeton, 1973), p. 489.

⁸Interrogation of Reich Marshall Hermann Goering, (Augsburg, 1945), p. 3.

⁹Headquarters Mediterranean Allied Air Forces, Allied Surrender Documents, Mediterranean Allied Air Forces (HQ, MAAF, 1945), p. 108.

¹⁰Combined Chiefs of Staff, Plan for Bomber Offensive, UK, p. 6.

¹¹Office of Asst. Chief of Air Staff, Intelligence, Impact (1945), pp. 3-7.

¹²Combined Chiefs of Staff, Plan to Assure the Most Effective Exploitation of the Combined Bomber Offensive (London, 1943), p. 1.

¹³Combined Chiefs of Staff, Plan for Bomber Offensive, UK, pp. 7-9.

¹⁴Ibid., p. 10.

¹⁵SHAEF Combined Strategic Targets Committee, POL, para. II.

16Air Effects Committee 12th Army Group, Effect Western Europe, p. 10.

17SHAEF Combined Strategic Targets Committee, Working Committee (A.F.V.'s), Weekly Bulletin No. 5 (London, 1945), p. 1.

18Air Effects Committee 12th Army Group, Effect Western Europe, p. 7.

19Wesley F. Craven, The Army Air Forces in World War II, Vol. III, (Chicago: The University of Chicago Press, 1951), p. 215.

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21Ibid., p. 62.

22F/LT H. P. Clough, Interdiction of Railways in Southern France and Northern Italy (Weekly Status Report) 11-17 Aug 1944 (HQ, MAAF, 1944), p. 1.

23Air Effects Committee 12th Army Group, Effect Western Europe, p. 65.

24SHAEF Combined Strategic Targets Committee, Minutes of the 21st Meeting, 7 March 1945 (London, 1945), para. 20.

25Committee No. 20, Strategic Air, p. 2.

26Ibid., p. 14.

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28Ibid., p. 11.

CHAPTER 4

TACTICAL INTERDICTION

INTRODUCTION

This chapter will look at tactical interdiction in World War II by defining the purpose of tactical interdiction, and comparing the differences in terms used in World War II and now. Tactics used and types of targets hit are examined next, along with the results achieved by the tactical interdiction campaign, in an attempt to identify the targets that produced the most immediate effect on the battlefield.

The purpose of the tactical interdiction campaign was to support the land battle. More specifically it was: "To hinder the movement of hostile troops and supplies both into and within the tactical area."¹ This remained true throughout the war although the method of accomplishing this goal changed as the war progressed. World War II saw the first large scale use of air power to support ground forces. The best way to employ this force was not known and went through several iterations by the end of the war.

The method to employ tactical air power in use at the end of the war most closely approximates present

doctrine; therefore, this study emphasizes that period. Also, the first large scale employment of tactical air power did not start until shortly before the Normandy invasion.² This study looks primarily at the effects of tactical interdiction from the time of the Normandy invasion, to the crossing of the Rhine River. After the Rhine River was crossed, resistance was very light and for all practical purposes the war was over.

As stated in Chapter 3, the primary US ground force in Normandy was the 12th Army Group which was supported by the 9th Air Force. The method of support and results achieved by the 9th Air Force will be analyzed in detail. To understand the effects of tactical interdiction, one must examine events all the way down to the platoon level.

PRIORITY SYSTEM

An understanding of the tactical air forces mission and their priority system is necessary in order to have something by which to measure their success or failure. In Chapter 1, the tactical interdiction mission consisted of three phases of prioritized operations. In fact, these missions were referred to as first priority, second priority and third priority. This was an interesting method and left no doubt as to what the mission should be in a given set of circumstances.

In today's terms, priority one would include counter air (CA), and air interdiction (AI) minus BAI. Priority two

would be BAI. That includes battlefield isolation and the destruction of enemy troops, vehicles and supplies. It does not include direct fire power support of the ground forces that requires radio contact. Priority three would be the CAS mission of today.

This priority system can be applied from the platoon/flight level up to the army/numbered air force level. An example of how the priority system can be used at the flight level follows. If a flight of fighters is conducting a priority two or three mission and enemy fighters appear, the friendly fighters revert to priority one to gain air superiority over their area of operation. This means they jettison their bombs (if necessary) and engage the enemy fighters.³

COMPARISON OF TERMS

One mission existed in World War II that does not tie in closely with today's application of airpower. That mission is armed reconnaissance (AR). Under today's method of operation, armed reconnaissance is considered a sub-mission of BAI.

During World War II, the US used armed reconnaissance as a sub-mission of priority two. A flight lead that had the armed reconnaissance mission would make radio contact with ground forces to check on any new target priorities they might have. Additionally, (while performing their armed reconnaissance mission) they would be available

to be vectored to a new target area by the ground forces. A similar system exists today with the procedure of contacting a Forward Air Control Post (FACP). This is an Air Force radar facility and is not the type of close radio contact with ground forces that was present in World War II. For the purpose of this study, armed reconnaissance will be assumed to be essentially the same as today and considered a subset of interdiction mission. The mission of armed reconnaissance in World War II was to conduct battlefield isolation.⁴

If the armed reconnaissance flight was needed by the ground in a close support role, they would be told so when they checked in with the ground forces. In this case, they would revert to a priority three mission and be given the frequency of the lead tank of a tank unit. After establishing radio contact with the lead tank, the flight would then roam out in front of the column to be their eyes. The fighters would find the enemy, engage them, and then direct the tanks into the battle from an advantageous position.⁵ In World War II they referred to this mission as armored column cover. No system similar to this presently exists. This mission is priority three, or close air support, and thus is beyond the scope of this study.

Priority two missions included the goal of battlefield isolation where attacks were made to systematically cut off an area. The fighters attacked

bridges and transportation facilities. In a small area they cut roads and rail lines and bombed villages to block the streets with debris. For tactical expediency they attacked defiles, marshalling yards, bridges, signal communications and moving columns. Attacks of supply dumps, ordnance, and hostile troop concentrations in rear areas also contributed to isolation of the battlefield.⁶

Post World War II analysis resulted in the following lesson learned in regard to the principles of battlefield isolation:

From a tactical standpoint any isolation program must be built around a ground plan, either offensive or defensive, and must be closely related to it.

Also mentioned in the analysis was that no campaign is complete, so leaks into the battlefield must be policed.⁷

Chapter 3 showed that strategic interdiction forces were often used to assist in the battlefield isolation mission. These forces concentrated on the periphery of the isolation area while the tactical interdiction forces were used within the entire battlefield isolation area. This overall effort to disrupt the enemy lines of communication was credited by German commanders as one of the most important factors contributing to their defeat.⁸

Reich Marshal Hermann Goering was asked after the war what tactical targets he felt hurt the German effort the most. His answer was:

In France prior to D-day it was 1. marshaling yards, then 2. low level attacks on troops, and 3. attacks on bridges.⁹

These targets were primarily priority two, or tactical interdiction targets. The next section of this chapter concentrates on the tactics, targets and effects of priority two missions.

TACTICAL INTERDICTION

Tactical interdiction was performed by fighter bombers and medium bombers. The TACs were made up primarily of Tactical Fighter Groups but also had Medium Bomber Groups organic to them. This was important because of long delays associated with getting bombers from the strategic mission, diverted to help a tactical mission. Also, medium bombers were necessary to provide needed, additional firepower/payload. The medium bombers had a limitation of needing 48 hours of mission preparation time which prevented their use in exploitation of targets of opportunity. Also, they were very susceptible to flak. This prevented them from hitting targets heavily defended by flak. Often, artillery was used to suppress flak when medium bombers were used in support close to ground forces. Approximately 74% of medium bomber sorties were used in a tactical interdiction role. Targets attacked were primarily bridges, rail installations, and supply facilities.¹⁰

The tactical interdiction campaigns of World War II will be evaluated by examining various types of ground campaigns, and then looking at the impact of tactical interdiction on those campaigns. Offensive ground operations will be examined first, followed by defensive. The first offensive operation to be covered is the Normandy invasion.

SUPPORT OF AN INVASION

The plan for employment of tactical interdiction sorties in support of the Normandy invasion included 9th Air Force medium bombers hitting coastal batteries with the fighter bombers protecting convoys and flying armed reconnaissance.¹¹ The results of this effort were attested to by the commander of the VII Corps, tasked with securing Utah beach. He stated:

the air forces provided their greatest assistance in these operations by protecting our troops from enemy aerial attack and by disrupting his communications and limiting the movement of enemy reserves.¹²

The interdiction campaign conducted before the landings to isolate the battlefield was a major contributor to the success of the landings.¹³

After the war, the German colonel in charge of transportation in the Normandy region, Oberst Hoeffner, made several comments on the effects of the battlefield isolation campaign. He stated that fuel received first priority for movement, and he was able to move the minimum required 1000

cubic meters of fuel to keep five divisions operating. However, he could only move this fuel at night, and that was the only commodity moved during that period. During daylight operations, troops could only be brought up in very small numbers. In Oberst Hoeffners' opinion, tactical interdiction attacks on rail communications amounted to 50% of the cause of German failure in Normandy.¹⁴

General Bayerlein was of the opinion that the greatest effect was achieved by attacks of roads. He stated that fighter bombers "...pinned down the German forces, chopped them to pieces, and paved the way for the breakthrough at St Lo and its exploitation." He felt that the inability to move his division, displace his guns, maneuver his tanks or bring up supplies during daylight, greatly hampered his operation. The attacks on communication centers in the Normandy area reduced the road capacity and delayed troop movements from one to five days. Attacks on key centers such as St Vith, reduced required road capacity by 30%. The Normandy invasion could not have succeeded without the extensive air power targeted against the roads.¹⁵

Oberst Hoeffner offered some details on the effect of these attacks on roads. He claimed that 30,000 trucks were destroyed in the Normandy campaign. Of the 2000 tons per day that trucks could transport, only 1200 tons were arriving at the front. This resupply was conducted almost

entirely at night. During this time of year that only left about eight hours a day. The remaining sixteen hours the trucks were idle. One must remember that more air power was available in this limited area than at any other time after that. The results of subsequent tactical interdiction campaigns were somewhat less due to smaller numbers of planes and greater areas to cover.¹⁶

SUPPORT OF LIMITED OBJECTIVE ATTACKS

Tactical interdiction was effective in supporting limited objective attacks. After the beachhead was secured, the Allies advanced towards ST LO. This included a limited objective attack from the Elle River to the St Lo Bayeux road. The German plans called for using one of their crack Panzer Lehr divisions in a counter attack. During this operation the Germans attempted to bring up reinforcements. These reinforcements consisted of 1500 partially trained paratroopers to fight as infantry soldiers. Ten fighter bombers from the IX TAC hit these troops as they were moving towards the battle and caused more than 200 casualties within five minutes. According to the German commander, General Bayerlein, this attack so demoralized the unit that it was unreliable for the rest of the campaign.¹⁷

Oberst Hoeffner stated after the war that in some cases it took up to ten days to bring up a reinforcing division. One division took thirty six hours to cover a distance normally covered in twelve. Supplies were another

big problem for the Germans. The German commanders wanted 7000 tons per day of supplies. Oberst Hoeffner estimated that they could survive on 5250 tons per day. Because of tactical interdiction of railroads, only 3300 tons could be supplied.¹⁸

Allied fighters were concentrating on an area about 20 kilometers behind the FLOT and were attacking any kind of movement. As soon as enemy assembly areas were detected, attacks were directed against them. The medium bombers of the tactical air forces were concentrating on isolating the Seine-Loire River area. This forced the enemy into piecemeal commitment of his troops and was thus of value to the ground battle. The greatest benefit to the ground battle in this limited objective attack came from tactical interdiction and armed reconnaissance with emphasis on the latter.¹⁹ It is significant to note that in this short duration campaign, it was not close air support that was most significant but rather tactical interdiction.

Another limited objective attack was to clear the Saar-Moselle Triangle. This triangle was formed by the Saar River in the east, the Moselle River in the west, and the Siegfried Line in the south. Initially, air support was hampered by weather. During the heavy fighting of the initial stages of this attack, air support was primarily priority three (CAS). Although this air support helped to hasten the enemies defeat, it was not a decisive factor in

the success or failure of the attack. What is interesting to note in this campaign is that once the enemy was on the run, priority three missions were released to conduct priority two missions. The effects of these priority two attacks were felt in later campaigns.²⁰

SUPPORT OF BREAKTHROUGH AND EXPLOITATION

The breakthrough and exploitation operations at St Lo were code named Operation Cobra. It began with a massive bombing by both strategic and tactical air forces. This was the first use of strategic air forces in a priority three mission. Results achieved by strategic air forces were not impressive. Tactical air forces were able to see visual markings placed by Allied troops because of the lower altitude that they flew and thus achieved better results. The best use of tactical interdiction assets was in the column cover and armed reconnaissance roles. In the breakthrough, Allied armored columns raced ahead on main roads in an exploitation mode. Armed reconnaissance was used in front of, and on the flanks of, the advancing troops. This armed reconnaissance was very effective in warning the Allies of enemy troop positions and frequently gave the earliest report of actual friendly front line locations. This exploitation phase was so effective that it did not stop until reaching the Siegfried Line.²¹

Tactical interdiction was used effectively during the exploitation phase. Gen. Patton's 3rd Army, supported

by XIX TAC, was so fast moving that it brought out new ideas in air support. Gen. Patton did not want bridges dropped to isolate the battlefield. Instead, he wanted to leave the bridges intact for later use. He wanted tactical air power to contain the enemies withdrawal by blocking roads along their escape route. In accomplishing this, he would be able to completely destroy the enemy. Also, he moved so fast that he had a very long, exposed southern flank. Rather than divert ground forces to protect that flank, he gave that job to the XIX TAC.²²

In their support of Gen Pattons 3rd Army, the XIX TAC air forces attacked enemy fuel and supply dumps and cut rail lines. The rapid movement along roads was often conducted without direct contact with the enemy. In this case, the column cover aircraft were often released to range about 30 miles ahead of the column. In these cases the biggest damage to enemy motor transport and horses was achieved.²³ An enemy POW summed up the efforts of the XIX TAC this way:

You have bombed and strafed all the roads, causing complete congestion and heavy traffic jams. You have also destroyed most of our gasoline and oil dumps, so there is no future in continuing the fight.²⁴

SUPPORT IN ASSAULT OF A DEFENDED RIVER LINE

The XIX TAC supported the crossing of the Moselle River in September 1944. Fighter bombers were used to attack enemy reinforcements, reserves, and supplies beyond

and to the flanks of the river crossing site. This use of tactical interdiction had a high priority in planning for air employment in support of this river crossing. The most effective use of tactical air forces was in the consolidation and expansion of the bridgehead. This included priority three as well as priority two, armed reconnaissance.²⁵

In support of the Roer River crossing operation in February 1945, excellent results were achieved by medium bombers attacking key communication centers, and marshalling yards in the area close to the river crossing site. These attacks were carried out before, during and after the day of the crossing and contributed to the enemies inability to mount a counter-attack or even maintain a coherent defense.²⁶

In support on the 9th Army river crossing of the Rhine River, the XXIX TAC prevented the enemy from making counter-attacks. In one such case, the commander of the XVI Corps was aware of a large build up of tanks apparently preparing for a counter-attack. The XXIX TAC had aircraft in the area performing armed reconnaissance who engaged the enemy unit. A prisoner of war from the 116 Panzer Division stated that his unit was attacked just as it was forming for a counter-attack. The air attack caused such confusion and destruction that the attack was called off.²⁷

When the 9th Armored Division captured intact the

railroad bridge over the Rhine River at Remagen, the IX TAC was called upon to conduct armed reconnaissance to support the securing of a bridgehead. The IX TAC mission was to prevent movement of enemy reserves into the area. Additional air assets were asked for in the form of medium bombers to help isolate the battlefield.²⁸ General Bayerlein stated, after the war that during the period 4 to 13 March 1945, tactical interdiction strikes hit thirty five small rail stations around the Remagen bridgehead. Air attacks were constantly pounding the rear areas. General Bayerlein had been given command of the corps tasked with the reduction of the bridgehead. He cites examples of delays in getting troops into the area. In one case, it took six days for a division coming from Denmark. Another unit was forced to detrain and march the final 100 km to the battle.²⁹

SUPPORT IN ASSAULTING A LINE OF PERMANENT FORTIFICATIONS

The air support given ground forces assaulting a line of permanent fortifications revealed several shortcomings in air operations. During the assault of the Siegfried Line, north of Aachen (September-October 1944), ground forces requested close support air to take out pillboxes. Fighter bombers of the IX TAC used napalm and found it had little effect.³⁰ No other ordnance available seemed to do any better. While fighter bomber attacks had little effect on pillboxes, at least one

division commander felt that these attacks were worthwhile in producing enemy casualties and lowering enemy morale.³¹

A planning shortfall was identified when medium bombers were used against pillbox type fortifications. The staff could not decide whether to use saturation bombing or pinpoint bombing. A compromise resulted. The results of the attack, conducted on 2 October 1944, did not materially aid the ground forces. The greatest support given the ground forces during this operation consisted of maintenance of air superiority, and the tactical interdiction and armed reconnaissance effort to isolate the battlefield.³²

SUPPORT IN ASSAULTS OF FORTRESS CITIES

Tactical interdiction was employed effectively in assaults of fortress cities. In the attack of Brest (26 August - 18 September 1944), tactical interdiction sorties were flown primarily against naval shore guns and other heavy artillery that was being used in a direct fire mode against Allied forces, and anti-aircraft artillery. While this effort helped, attacks against reinforced concrete positions were ineffective due to munition inadequacies. A diary captured from a German naval artilleryman indicated that hits on his position (constructed with three meters of reinforced concrete) resulted in filling the position with smoke.³³

Similar effects resulted from attacks against the

fortresses at Metz. In an attack of Fort Driant, thirty five fighter bombers dropped a total of twelve 1000 lb. bombs and fourteen canisters of napalm inside the fort. A large explosion with smoke rising to 4000 feet resulted. However, when the ground forces began to attack, they were still met with intense resistance. It became apparent to US leaders that despite the intensity and accuracy of fighter bombers, the effect of attacks on reinforced concrete structures was negligible.³⁴

SUPPORT IN ATTACKING A FORTIFIED POSITION

Tactical interdiction was successfully employed to support ground action involved in attacking a fortified position not involving permanent fortifications. In the Foret De Haye area during 10-12 September 1944, fighter bombers and medium bombers destroyed specific enemy installations, troops, motor transport, armored vehicles and tanks, and railroad facilities. This effort was the deciding factor in forcing the enemy to abandon his defense of this area. The enemy had been unable to sufficiently reinforce the area because of the battlefield isolation effort of the armed reconnaissance missions.³⁵

In the Aachen area during the period 23 September - 21 October 1944, tactical interdiction aircraft attacked defended road junctions, pill-boxes, and emplaced artillery. This effort was conducted by the XIX TAC to isolate the battlefield and thus help VII Corps take the city. Although

this attack also included priority three missions, it was felt that the interdiction and armed reconnaissance effort to isolate the battlefield was the most beneficial in supporting the battle.³⁶

SUPPORT OF AIRBORNE OPERATIONS

During the Normandy landings, tactical interdiction sorties softened up the drop zones prior to the arrival of airborne troops. One of the key targets was enemy antiaircraft artillery. Once the airborne forces were on the ground, attacks were made on lines of communication facing the airborne force. Additionally, armed reconnaissance sorties were flown out in front of the ground forces and preplanned missions were flown against bridges in the area. This effort resulted in delaying the enemies reaction to the airborne landings. One target, St. Martin Barreville, was so completely neutralized that it was easily taken by the landing airborne troops. While the tactical interdiction effort was successful in its goal, the ground forces needed more help in the form of priority three missions. At this point in the war; however, the method of coordinating air-ground cooperation needed refinement.³⁷

This problem still existed on 18 September 1944 when the airborne operation, Market Garden, was made at Arnhem. Air support was conducted in the form of armed reconnaissance; however, the area patrolled was predetermined and thus unable to react to new

information.³⁸ Had the Allies had a radar controlled intercept (GCI) station or an airborne warning and control system (AWACS) as exists today, the outcome might have been quite different.

This completes the treatment of tactical interdiction in support of offensive operations. The remainder of this chapter deals with support given to defensive operations. Defensive operations can be divided into active and static defense, and retrograde movements. Two active defenses will be looked at first.

SUPPORT IN AN ACTIVE DEFENSE

On the morning of 7 August 1944, the Germans launched a heavy counter attack against US ground forces near Mortain in Brittany. The attack consisted of five panzer divisions against elements of the US VII Corps. In support of this intense battle, the 1st Army gave up their priority to IX TAC sorties and asked that priority be given to support the campaign at Mortain. A good illustration of the support given in the form of armed reconnaissance was where a squadron on patrol located a twenty vehicle column and claimed destruction of the entire column. In another example, seven P-47s claimed destruction of twelve tanks, five staff cars, four half tracks and four light flak positions, plus damage to four other tanks. This type of support made it difficult for the enemy to mass forces for concentrating his effort and aided decisively in stopping

the German counter attack. The flexibility which enabled shifting of air assets, was also a contributing factor in defeating the counter attack.³⁹

Another active defense occurred during the German counter attack in the Ardennes. The defense at Bastogne during this operation was unique in that the Allied forces were completely surrounded. This made the communications and other operational coordination problems unimportant. The tactical interdiction forces were free to hit any target surrounding the Bastogne area. The interdiction effort prevented the Germans from employing their supplies and reserves freely to influence the action.⁴⁰

General von Rundstedt admitted after the war that Allied attacks on railheads had a devastating effect on the German advance. He went on to say that loss of forward railheads caused the traffic to become hopelessly clogged, and combined with attacks on roads, resulted in the eventual halt of the offensive. General Bayerlein made this statement after the war:

During the Ardennes offensive, fuel had to be fetched from Troisdorf (SE of Köln), spare parts and tanks from Bergish-Gladbach, as the railways had been destroyed. The trucks were on the road six days. The troops got into critical situations. That is why so many tanks had to be left behind during the retreat from the Ardennes for lack of fuel.⁴¹

SUPPORT IN A STATIC DEFENSE

Allied experience with static defense operations during World War II occurred primarily along the northern

flank of the 1st Army during the time of the German counter attack in the Ardennes. With so many forces being diverted to support the Ardennes campaign, one fifteen mile section of the 9th Army front had only two divisions defending. This situation sparked the idea to include air power in an operations plan to be executed if the Germans conducted a major attack. This plan was drafted and distributed to the units but, fortunately, was never executed. In this situation, air power offered the only offensive force available and marked the first realization of the air forces role in such an action. Because there was only sporadic, harassing action in this area, air power concentrated on tactical interdiction. Targets attacked, that were close to Allied defensive lines, were primarily bridges. This was done to strengthen the defense. Further out, communications centers and defended villages were hit. Also, a concerted effort was made to interdict rail and motor transport moving south towards the Ardennes area.⁴²

SUPPORT OF RETROGRADE MOVEMENTS

The battle in the Ardennes, while not a true retrograde movement, contained some characteristics of a retrograde movement and will be evaluated as such. Air support was initially very limited due to poor weather, a condition the Germans found necessary as a prerequisite to launching their attack. Once the weather broke, the Allies conducted a thorough interdiction program against road nets

within and outside the Ardennes area. The result was that the enemy was forced to exert considerable effort towards keeping his supply lines open and to maintain an escape route.⁴³

SUMMARY

This chapter covered tactical interdiction in World War II and assessed the effects of the effort on various types of ground operations. Several items stand out in this study of tactical interdiction. One is that tactical interdiction, employed to isolate the battlefield, was a very effective way to support the ground battle. Another was that attempts to hit permanent fortifications resulted in little to no damage. The following chapter will look at these and other lessons learned and apply them to present day conditions.

FOOTNOTES

¹AAF Evaluation Board, Tactics in ETO, p. 2.

²Ibid, preface.

³Air Effects Committee 12th Army Group, Effect Western Europe, p. 39.

⁴Ibid, pp. 38-39.

⁵Ibid, p. 112.

⁶Ibid, p. 58.

⁷Ibid, p. 59.

⁸War Department, Air Power in the European Theater of Operations, (Washington, 1947), p. 9.

⁹Goering Interrogation, p. 9.

¹⁰Air Effects Committee 12th Army Group, Effect Western Europe, pp. 29-31.

¹¹Ibid, pp. 88-89.

¹²Ibid, p. 92.

¹³Ibid.

¹⁴Ibid, pp. 175-176.

¹⁵Ibid, pp. 179-182.

¹⁶Ibid, pp. 179-180.

¹⁷Ibid, p. 94.

¹⁸Ibid, p. 176.

¹⁹Ibid, p. 93.

²⁰Ibid, p. 98.

²¹Ibid, pp. 102-105.

22Headquarters Army Air Force, Air-Ground Teamwork on the Western Front, (HQ, MAAF, 1945), p. 5.

23Ibid, pp. 10-11.

24Ibid, p. 20.

25Air Effects Committee 12th Army Group, Effect Western Europe, pp. 113-115.

26Ibid, p. 116.

27Ibid, p. 122.

28Ibid, pp. 123-124.

29Ibid, p. 177.

30Ibid, pp. 126-127.

31Ibid, p. 217.

32Ibid.

33Ibid, pp. 130-132.

34Ibid, p. 135.

35Ibid, p. 140.

36Ibid, pp. 141-142.

37Ibid, pp. 143-144.

38Ibid, p. 144.

39Ibid, pp. 147-149.

40Ibid, pp. 151-152.

41Ibid, pp. 176-177.

42Ibid, pp. 152-153.

43Ibid, pp. 155-157.

CHAPTER 5

ANALYSIS, CONCLUSIONS, and RECOMMENDATIONS

INTRODUCTION

This chapter analyzes the effects of the strategic and tactical interdiction campaigns of World War II. From this analysis, high value targets are identified and conclusions are drawn on the effects of the interdiction campaign of World War II in the European Theater of Operations and the factors effecting high value targets. Then comparisons are made to modern day warfare to give examples of what is likely to constitute a high value target in future wars. The chapter concludes with recommendations for future study.

This study examined several high value targets from the interdiction campaign of World War II. High value targets are dependent upon the enemy's needs, i.e., his most critical needs represent the most valuable target for the friendly force to destroy. Also, any target that when destroyed will reduce the enemies ability to move his war fighting potential into a position to influence the ground battle to the detriment of the friendly scheme of maneuver,

can be considered a high value target.

ANALYSIS OF STRATEGIC INTERDICTION EFFORT

The strategic interdiction campaign of World War II is evaluated first against the effect of destroying resources and then lines of communication. In the case of resources, high value targets are determined to a large degree based on the time period from target destruction to effect on the battlefield. It is helpful to specify a time period by which the effects can be measured. For the purposes of this study a time period of approximately two months is assumed. Each of these are briefly examined to determine whether they had a measurable effect on the battlefield within two months of target destruction.

RESOURCES

Chapter 3 listed the six major target types the Allies attacked in an effort to destroy the German military potential. The Allied strategy began with attack on the German aircraft industry having first priority. The Luftwaffe had superior forces during the Battle of Britain but gradually lost this advantage. By the time of the Normandy invasion, the Allies were able to establish and maintain air superiority. This allowed the Allies to divert fighter assets more towards support of the ground forces. These additional Allied fighters had an immediate effect on

the land battle; however, the fighters were made available by a lengthy campaign against the German aircraft industry and aircraft on the ground and in the air. Because of this, the aircraft industries do not fall into the category of a high value target.

As shown in Chapter 3, attacks against ball bearing plants had little effect on the war¹. Therefore, ball bearing plants did not constitute a high value target. Attacks on oil reduced production by as much as fifty percent² and caused Germany to have to dip into its strategic reserves.³ However, oil did not become critical until near the end of the war and is not considered a high value target.

The target category synthetic rubber and tires was never the number one priority target and no information was found to suggest that this constituted a high value target. The Combined Targets Committee placed emphasis at one point on military vehicles but evidence exists that indicates no serious shortage of vehicles was evident, thus, this is not considered a high value target.⁴ The result of the strategic interdiction campaign against German resources was that none of the target systems attacked by the Allies had an effect on the battlefield within two months.

LINES OF COMMUNICATION

The strategic interdiction campaign against lines of communication had a much greater effect on the battlefield

than the campaign against resources. The strategic forces conducted several battlefield isolation campaigns that were quite successful and had an effect on the battle that was felt within days. The Allies learned the importance of conducting their battlefield isolation campaign in conjunction with the ground commanders maneuver scheme. When this occurred, lines of communication constituted high value targets. Oil production was not seriously hampered but oil was in serious shortage at the front due to Allied efforts against the lines of communication needed to bring the oil forward.

In summary, the strategic interdiction campaign of World War II achieved the greatest effect in the shortest time when it participated in battlefield isolation efforts. The high value targets were rail and road lines, bridges, and marshalling yards. These targets were only high value when they were located in proximity to the battle and when their destruction complimented the ground commanders scheme of maneuver.

ANALYSIS OF TACTICAL INTERDICTION EFFORT

The tactical interdiction forces had the mission to hinder the movement of troops and supplies⁵. This mission caused Allied planners to focus on lines of communication. The planners were concerned with movement

both into and within the tactical area, or battlefield isolation area, but concentrated more on movement within the tactical area. The periphery of this area was interdicted by medium and heavy bombers of the strategic forces and focused on the major arteries into the area. The tactical forces hit lines of communication plus signal communications, defiles, moving columns, supply dumps, ordnance, and hostile troop concentrations.

All of the targets attacked by the tactical interdiction forces, whether in a battlefield isolation or armed reconnaissance role, contributed to the mission to hinder the enemy's movement. This effort was so successful that German resupply attempts were limited almost exclusively to the hours of darkness.⁶ The most valuable targets hit were marshalling yards, troops, and bridges according to Goering,⁷ and attacks on rail lines⁸ and roads⁹ in general, according to other senior German officers. Denying the Germans access to lines of communication greatly hampered their ability to maneuver tanks, displace guns, or bring up sufficient supplies, thereby restricting their ability to influence the battle.

Times existed when it was better to concentrate attacks against lines of communication in a battlefield isolation role and to emphasize attacks on supply dumps, troop concentrations, enemy columns, etc., in an armed reconnaissance role. Armed reconnaissance was more

applicable in limited objective attacks and in breakthrough and exploitation operations. Battlefield isolation targets or lines of communication, were emphasized during all other missions. There is one minor exception that applies to support of airborne operations prior to the airdrop. At this time, the primary target was enemy anti-aircraft artillery. Once the airborne troops were on the ground the priority reverted to lines of communication to isolate the airborne troops and protect them against the enemy until a land linkup could be effected.

The tactical interdiction forces of World War II conducted a "guard" mission at one point in support of General Patton's Third Army. The mission was given to the XIX TAC and involved guarding the southern flank of the Third Army,¹⁰ traditionally a cavalry mission. This marked the first use of the Air Forces in this role. They were very effective in this instance but were not and have not been used in this role since. In this role, targets hit were lines of communication and enemy columns advancing on the flank.

There appears to be only one area in which tactical interdiction forces had difficulty in accomplishing their mission. This occurred whenever they attempted to destroy permanent fortifications made of thick reinforced concrete. The problem was lack of a suitable munition that was capable of penetrating these structures.

In summary, the tactical interdiction campaign of World War II was very successful in accomplishing its mission to deny the enemy freedom of movement. The high value targets included all lines of communication, supply dumps, troop concentrations and enemy columns. These targets were most valuable when their destruction complimented the ground commanders scheme of maneuver.

CONCLUSIONS

The high value targets of World War II included marshalling yards, rail lines, roads (this included bombing villages to block streets with debris), defiles, supply dumps, troop concentrations, enemy columns, bridges, communication centers, signal communications, and anti-aircraft artillery in support of airborne operations. It is impossible to pick a specific target and call it the highest value target because the relative value is dependent on the situation and the type of operation. Conversely, the target type that has the lowest value can be identified as any target which is beyond the capability of possessed munitions to destroy. In World War II this was primarily permanent fortifications made of very thick reinforced concrete.

The interdiction campaign of World War II was very effective and produced many lessons learned that can help

identify future high value targets. An important factor in the success of any interdiction campaign is the identification of these high value targets. They can be identified by determining which targets, when destroyed, cause the enemy the most difficulty in continuing his operation.

Future wars are likely to be characterized by high mobility and rapid gains. This condition will force the interdiction campaign to focus on high value targets that bring a rapid payoff. This focus should be on battlefield isolation and the targets should include marshalling yards, rail lines, roads, defiles, supply dumps, troop concentrations, enemy columns, bridges, communication centers, signal communications, and anti-aircraft artillery. These targets must compliment the ground commanders scheme of maneuver.

COMPARISON TO MODERN DAY WARFARE

Several technological advances have been made that make it possible to accomplish things now that were impossible in World War II. One of the most significant advances has been in accuracy. Modern fighters possess the accuracy and capability to destroy a bridge in any weather with only one or two airplanes. This task would have taken a large force of bombers in World War II and would only have

been possible in good weather. While in World War II the capability existed to carry large numbers of bombs, a higher probability of target destruction with fewer bombs exists today.

Another technological breakthrough makes it possible to penetrate reinforced concrete. Many weapons now have terminal guidance making them "smart" and improved speed/warheads which permits greater penetration. These new capabilities may create new high value targets such as revetted aircraft, hardened command centers, and permanent fortifications.

Many of the high value targets of World War II have applicability to future wars. For example, the Soviets are particularly dependent upon rail to supply their forces. In addition, the Soviet rail size is different than the European system thus requiring them to stop at the end of the Soviet line and transfer supplies to a European train. This would likely produce a concentration of supplies at marshalling yards where Soviet lines terminate, thus creating a high value target. Interdicting rail lines in the battlefield area would also deny the enemy valuable supplies.

Roads, on the other hand, may not be high value targets in a future European war. The European road system is highly developed and thus the interdiction campaign may be overloaded with targets. It might be useful, however, to

hit roads that move through defiles and other choke points.

The intelligence gathering assets of today will greatly aid in the identification of high value targets. For example, the ability of modern radars to identify targets that are moving will help commanders determine which forces are moving up to reinforce and what routes the enemy is using as main supply routes.

The Allies maintained air superiority during the interdiction campaign of World War II. This was so important that Allied fighters would revert to this priority one mission whenever the Luftwaffe appeared. With air superiority assured, the bombers could concentrate on target destruction. With modern air defense systems that include many surface-to-air missiles, a new dimension is added which requires neutralization prior to, and/or in conjunction with, interdiction operations.

RECOMMENDATIONS FOR FURTHER STUDY

A study of the interdiction campaign of the Korean war would be beneficial in determining high value targets in a smaller theater. A review of the interdiction effort in the Arab-Israeli wars will also give insight into high value targets of short duration wars.

A study should be conducted to construct a methodology to identify high value targets based on the

ground commanders mission and scheme of maneuver, the enemy situation, and the time available. A methodology that could be placed in a computer would be very useful to target planners in future wars.

FOOTNOTES

¹Committee No. 20, Strategic Air, p. 8.

²Air Effects Committee 12th Army Group, Effect Western Europe, p. 10.

³ULTRA message, DTG 062356Z 6/44.

⁴Air Effects Committee 12th Army Group, Effect Western Europe, p. 7.

⁵AAF Evaluation Board, Tactics in ETO, p. 2.

⁶Air Effects Committee 12th Army Group, Effect Western Europe, pp. 175-176.

⁷Goering Interrogation, p. 9.

⁸Air Effects Committee 12th Army Group, Effect Western Europe, pp. 175-176.

⁹Ibid, pp. 179-182.

¹⁰Hq AAF, Air-Ground Teamwork, p. 5.

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